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**NATIONAL INDUSTRIAL CHEMICALS NOTIFICATION  
AND ASSESSMENT SCHEME**

**FULL PUBLIC REPORT**

Polymer in HC-96-3259

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Copies of this full public report may also be requested, free of charge, by contacting the Administration Coordinator on the fax number below.

For enquiries please contact the Administration Section at:

*Street Address:* 334-336 Illawarra Road MARRICKVILLE NSW 2204, AUSTRALIA

*Postal Address:* GPO Box 58, SYDNEY NSW 2001, AUSTRALIA

*Telephone:* (61) (02) 8577 8816 FAX (61) (02) 8577 8888

Director  
Chemicals Notification and Assessment

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**FULL PUBLIC REPORT**

Polymer in HA-96-3259

**1. APPLICANT**

PPG Australia Pty Ltd of McNaughton Road, Clayton, VIC 3168 (ABN 82 055 500 939) has submitted a notification statement in support of their application for an assessment certificate for the synthetic polymer of low concern (PLC) HA-96-3259.

**2. IDENTITY OF THE CHEMICAL**

The chemical name, CAS number, molecular and structural formulae, molecular weight, spectral data and details of the polymer composition have been exempted from publication in the Full Public Report.

**Marketing names:** HA-96-3259

**3. POLYMER COMPOSITION AND PURITY**

Details of the polymer composition have been exempted from publication in the Full Public Report.

**4. PLC JUSTIFICATION**

The notified polymer meets the PLC criteria.

The polymer has a molecular weight >1000, and %MW <500 and < 1000 within the prescribed limits. It contains reactive functional groups of low concern.

**5. PHYSICAL AND CHEMICAL PROPERTIES**

The notified polymer is manufactured in a xylene-n-butyl acetate solution and is never isolated.

<b>Property</b>	<b>Result</b>	<b>Comments</b>
<b>Appearance</b>		The polymer solution is an amber coloured, viscous liquid
<b>Boiling point</b>	Not determined	

<b>Density</b>	1035 kg/m <sup>3</sup>	
<b>Water solubility</b>	Not provided	The polymer in HA-96-3259 is not expected to be water soluble. This is consistent with its predominantly hydrocarbon structure, though the presence of both free carboxylic acid and alcohol functionality, as present in the structure provided, should help increase solubility.
<b>Particle size</b>	Not applicable	The notified polymer is not isolated from solution
<b>Flammability limits</b>	1-7%	(for Xylene)
<b>Autoignition temperature</b>	500°C	(for Xylene)
<b>Explosive properties</b>	Not provided	
<b>Stability/reactivity</b>		The polymer and the polymer solution are stable, but should be protected from oxidising agents
<b>Hydrolysis as function of pH</b>	Not provided	The polymer contains ester linkages that could be expected to undergo hydrolysis under extreme pH conditions. However, in the environmental pH range of 4 to 9, significant hydrolysis is unlikely to occur.
<b>Partition coefficient</b>	Not provided	Due to the notified polymer's likely low water solubility it is expected to partition into the organic phase.
<b>Adsorption/desorption</b>	Not provided	As a consequence of its hydrophobic nature, the polymer is expected to associate with the soil matrix and sediments and as such will be immobile in soil.
<b>Dissociation constant</b>	Not provided	No dissociation constant tests were conducted for the polymer. However, the polymer contains a small amount of carboxylic acid functional groups, which are expected to have typical acidity.

## 6. USE, VOLUME AND FORMULATION

**Use:**

The polymer will be used in paint for automotive refinish and industrial coatings.

**Manufacture/Import volume:**

The polymer in HA-96-3259 will initially be imported but is expected to be manufactured locally in the future. Less than 15 tonnes of the polymer will be imported/manufactured in the first year rising to less than 50 tonnes by year five.

**Formulation details:**

The polymer in HA-36-3259 will exist in a solution, 60% by weight with Xylene and n-Butyl acetate. The polymer will be used at levels up to 35% by weight in the paint.

Initially, the polymer will be imported and stored prior to being transferred to the paint manufacturing plant. The polymer will also be manufactured in Australia in a closed reactor and then pumped into 200 L steel drums prior to formulation into paint.

During paint formulation the polymer will be loaded into a blending vessel with other paint ingredients and stirred to create a solution containing up to 35% the notifier polymer. The polymer solution is then pumped into paint cans (4 and 20 L) for distribution to customer sites.

At the customer's site, the polymer will be applied to motor vehicle bodies and panels via spray application. After application the automotive parts to which the paint containing the notified polymer has been applied will be heat cured.

**7. OCCUPATIONAL EXPOSURE**

<b>Exposure route</b>	<b>Exposure details</b>	<b>Controls indicated by notifier</b>
<b><i>Polymer Manufacture</i></b>		
Sampling, testing and filling of polymer solution into drums: 9 workers, 8 hours/day/10 days/year		
dermal	Spillage during filtration and drum filling procedures	reaction vessel enclosed, exhaust ventilation for filling operations, goggles, coveralls and impervious gloves worn
<b><i>Paint Manufacture</i></b>		
Paint make-up: 3 workers, 8 hrs/day, 30 days/year		
dermal	Spillage during blending procedures	exhaust ventilation for filling operations, goggles, coveralls and impervious gloves worn
Quality control: 3 workers, 8 hours/day, 30 days/year		
dermal	Spillage during testing and adjustment procedures	Mixers are fitted with exhaust ventilation, exhaust ventilation for filling operations, goggles, coveralls and

impervious gloves worn

Filling into drums: 3 workers, 8 hours/day, 30 days/year

dermal	Spillage during filtration and filling procedures	exhaust ventilation, goggles, coveralls and impervious gloves worn
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***End use***

spray painting: 800 workers, 4 hours/day, 220 days/year

Inhalation and/or dermal	Spilling during activation and thinning of paint, cleaning of spray equipment. Exposure to vapour/aerosol during application of paint (spraying).	Paint is sprayed in a well ventilated, down draft spray booth with a minimum volume of four air changes per minute. Flame retardant overalls, anti-static footwear, impervious gloves and eye protection conforming to Australian Standard AS/NZ 1337.
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***Transport and storage***

Paint is transported in sealed cans, so contact is unlikely to occur except in the event of a spill.	PPE worn includes: coverall, anti-static footwear, goggles and gloves.
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***Disposal***

Waste disposal contractors

Dermal	Paint residue dries to a solid, so exposure/contact is unlikely.	PPE worn includes: coverall, anti-static footwear, goggles and gloves.
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**8. PUBLIC EXPOSURE.**

Paint products containing the polymer in HA-96-3259 are not available for sale to the general public and will only be used by professional spray painters. The potential for public exposure to the polymer during transport, manufacture, use and disposal is assessed as negligible. Members of the public may make dermal contact with items coated with products containing the polymer. However, exposure will be negligible because the polymer is likely to be bound within the cured paint film.

**9. ENVIRONMENTAL EXPOSURE**

**9.1. Release**

Up to 200 kg per annum of the polymer in HA-96-3259 will be disposed of during its manufacture. During application of the paint approximately 70% is captured as overspray. Therefore, up to 28 tonnes of the polymer will be released during the application the paint and up to a further 800 kg will be disposed of within the empty paint containers.

**9.2. Fate**

The majority of the polymer in HA-96-3259 will be crosslinked with other paint components to form a very high molecular weight and stable paint film. It is expected that deterioration of the paint formulation will be negligible over the average life (20 years) of a motor vehicle. Therefore, once incorporated into the paint formulation, the polymer is expected to be immobile and pose little risk to the environment. As the coating degrades over time, any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The metal panels and car bodies coated with the polymer are likely to be either recycled for steel reclamation or be placed into landfill at the end of their useful life. When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon and nitrogen.

The polymer in waste from spills and equipment cleaning will be treated by a distillation process whereby the solvent is reclaimed and the remaining solid containing the polymer will be disposed of in landfill. The polymer in overspray will also be disposed of in landfill.

The polymer is not expected to be water soluble and therefore will not be mobile in either the terrestrial or aquatic compartments. As a consequence of its low water solubility, the polymer is expected to associate with the soil matrix and sediments. The polymer is not expected to cross biological membranes due to its high molecular weight and low water solubility and is therefore not expected to bioaccumulate (Connell 1990).

## 10. EVALUATION OF HEALTH EFFECTS DATA

No toxicological data were submitted.

The health hazards of the constituents and hazardous impurities, additives and adjuvants are tabulated below.

Chemical	Health hazards <sup>a</sup>	Regulatory controls <sup>b</sup>
<b>Hazardous impurities</b>		
none		
<b>Additives/adjuvants</b>		
Xylene	Flammable	TWA: 80 ppm (350 mg/m <sup>3</sup> )
	Harmful by inhalation and contact with skin	STEL: 150 ppm (655 mg/m <sup>3</sup> )
	Irritating to skin	
<b>n-butyl acetate</b>		TWA: 150 ppm (713 mg/m <sup>3</sup> )  STEL: 200 ppm (950 mg/m <sup>3</sup> )

a. NOHSC, 1999a

b. NOHSC, 1995

## **11. EVALUATION OF ENVIRONMENTAL EFFECTS DATA**

No ecotoxicological data were provided.

## **12. ENVIRONMENTAL RISK ASSESSMENT**

The majority of the polymer in HA-96-3259 will be crosslinked with other paint components to form a very high molecular weight and stable paint film. Therefore, once incorporated into the paint formulation, the polymer is expected to be immobile and pose little risk to the environment. As the coating degrades over time, any fragments, chips and flakes of the coating will be of little concern as they are expected to be inert. The metal panels and car bodies coated with the polymer are likely to be either recycled for steel reclamation or be placed into landfill at the end of their useful life. When recycled the polymer would be destroyed in furnaces and converted to water vapour and oxides of carbon and nitrogen.

The polymer in waste from spills and equipment cleaning will be treated by a distillation process whereby the solvent is reclaimed and the remaining solid containing the polymer will be disposed of in landfill. The polymer in overspray (up to 70% of imports) will also be disposed of in landfill.

The polymer is not expected to be water soluble and therefore will not be mobile in either the terrestrial or aquatic compartments. As a consequence of its low water solubility, the polymer is expected to eventually associate with the soil matrix and sediments. Due to its high molecular weight and low water solubility the polymer is not expected to bioaccumulate.

The polymer is not likely to present a hazard to the environment when it is stored, transported and used in the proposed manner.

## **13. HEALTH AND SAFETY RISK ASSESSMENT**

### **13.1. Hazard assessment**

No toxicological information has been provided for the polymer in HA-96-3259. The polymer meets the PLC criteria and is unlikely to be a hazardous substance according to the NOHSC *Approved Criteria for Classifying Hazardous Substances* (NOHSC, 1999b). The polymer solution HA-96-3259 Air-Drying Short Oil Alkyd Resin 6689 is a hazardous substance due to the content of aromatic solvents. It is classed as a Class 3 dangerous good (flammable liquid) because of the solvent content.

The MSDS for the polymer solution HA-96-3259 Air-Drying Short Oil Alkyd Resin 6689 lists a number of potential health effects. Inhalation of the vapour may irritate the mucous membranes and the respiratory tract and result in headaches, dizziness and nausea. Inhalation of high concentrations can produce central nervous system depression leading to loss of co-ordination, impaired judgement and, if exposure is prolonged, unconsciousness. Swallowing can result in nausea, vomiting and central nervous system depression. Contact with skin will have a degreasing action and cause irritation. Contact with the eyes will cause irritation, which can result in redness, stinging and lacrimation. Inhalation of aerosol droplets may cause respiratory sensitisation of some workers with asthma-like symptoms. Repeated



exposure may lead to irritant contact dermatitis. The symptoms relate mainly to the solvents, xylene and n-butyl acetate, rather than the notified polymer.

The polymer itself is non-volatile, and because of the high molecular weight is not expected to cross biological membranes. Although the polymer has functional groups of low concern, the polyunsaturated portion of the polymer will allow the resin to crosslink through auto oxidation. There have been no reported incidences of adverse effects on the occupational health of workers using the polymer overseas.

### **13.2. Occupational health and safety**

The polymer solution is manufactured in a closed reactor and then drummed off for further processing into paint. There is limited scope for exposure during this process. Paint manufacture employs the use of mixers fitted with exhaust ventilation to capture any vapour generated at source. Both polymer and paint are filled into containers under exhaust ventilation to capture any vapour generated.

The final paint mix including the pre-prepared paint component containing the notified polymer could contain a wide variety of additional ingredients. This is likely to introduce human health hazards due to the presence of potentially toxic solvents. The spraying procedure also produces a dense aerosol, which could adversely affect human health even in the absence of additional hazardous components. It is also probable that professionals involved in the spray painting industry will use a number of different paint formulations.

For these reasons, the polymer in HA-96-3259 must be assessed for the contribution it makes to the hazards associated with spray application of the paint. The presence of many potential and actual hazardous substances in the formulations requires the use of stringent engineering controls, such as a correctly constructed and maintained spray booth, and of a high level of personal protective equipment, such as impermeable overalls and gloves and a full face shield and respirator. The use of the paint containing the polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting* (NOHSC, 1999c). The level of protection from exposure afforded by the standard protective measures will provide adequate protection from the polymer, which is likely to be less intrinsically toxic than most of the solvents and pigments and also some other paint resins.

Once the applied final paint mix has hardened, the polymer will not be separately available for exposure or absorption.

There are NOHSC exposure standards for xylene and butyl acetate, identified as ingredients in the paint solution containing HA-96-3259. The employer is responsible for ensuring that these exposure standards, and exposure standards pertaining to other final paint mix additives, are not exceeded in the workplace.

The solutions containing the polymer are flammable due to their solvent content. Precautions must be taken to avoid sources of ignition, e.g. use of earthing leads. Operators should wear antistatic overalls and footwear.

Similar considerations apply in the cleaning of spray equipment and disposal of the polymer. The wastes containing the polymer may be hazardous materials on the basis of the solvent

and other resin content, and the precautions used for the additional materials should be adequate for protection from the polymer. In addition, much of the polymer will be crosslinked and hardened, and therefore immobile, by the time of disposal.

The polymer itself is of low hazard, and apart from the controls already in place to prevent exposure to other paint components, and to the polymer in particulate form during spraying, no additional controls are required.

### **13.3. Public health**

Paint products containing the notified chemical are not available for sale to the general public and will only be used by professional spray painters. The potential for public exposure to the notified chemical during transport, manufacture, use and disposal is assessed as negligible. Members of the public may make dermal contact with items coated with products containing the notified chemical. However, exposure will be negligible because the notified chemical is likely to be bound within a cured paint film and therefore the risk to public health is considered to be very low.

Therefore, the polymer in HA-96-3259 Air Drying Short Oil Alkyd Resin 6689 will not pose a significant hazard to public health when used in the proposed manner.

## **14. MSDS AND LABEL ASSESSMENT**

### **14.1. MSDS**

The MSDS of the notified polymer in HA-96-3259 provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Preparation of Material Safety Data Sheets* (NOHSC, 1994a). It is published here as part of the assessment report. The accuracy of the information on the MSDS remains the responsibility of the applicant.

### **14.2. Label**

The label for the notified polymer in HA-96-3259 provided by the notifier was in accordance with the NOHSC *National Code of Practice for the Labelling of Workplace Substances* (NOHSC, 1994b). The accuracy of the information on the label remains the responsibility of the applicant.

## **15. RECOMMENDATIONS**

### *Control Measures*

#### **Occupational Health and Safety**

No specific measures are required for the notified polymer. However, in the interest of good occupational health and safety, the following controls are recommended:

- Employers should implement the following safe work practices to minimise occupational exposure during handling of paints containing the polymer in HA-96-3259
  - Use of the paint containing the notified polymer should be in accordance with the NOHSC *National Guidance Material for Spray Painting*;

- Employers should ensure that NOHSC exposure standards for all of the components of the final paint mix are not exceeded in the workplace.
- Employers should ensure that the following personal protective equipment is used by workers to minimise occupational exposure to the solvent solution containing the notified polymer:
  - impervious gloves, coveralls and goggles for the manufacture of the polymer and the paint.Guidance in selection of personal protective equipment can be obtained from Australian, Australian/New Zealand or other approved standards.
- A copy of the MSDS should be easily accessible to employees.
- If products and mixtures containing HA-96-3259 are classified as hazardous to health in accordance with the NOHSC *Approved Criteria for Classifying Hazardous Substances* (1999b), workplace practices and control procedures consistent with provisions of State and Territory hazardous substances legislation must be in operation.

#### Emergency procedures

The following emergency procedures are recommended:

In the event of a spill, HA-96-3259 should be contained as described in the MSDS (i.e. absorbed onto soil, sand or other inert material) and the resulting waste disposed of in landfill.

#### Secondary notification

The Director of Chemicals Notification and Assessment must be notified in writing within 28 days by the notifier, other importer or manufacturer:

- (1) Under Section 64(1) of the Act; if
  - the notified polymer is introduced in a chemical form that does not meet the PLC criteria.

or

- (2) Under Section 64(2) of the Act:
  - if any of the circumstances listed in the subsection arise.

The Director will then decide whether secondary notification is required.

## 16. REFERENCES

Connell D. W. (1990) General characteristics of organic compounds which exhibit bioaccumulation. In Connell D. W., (Ed) Bioaccumulation of Xenobiotic Compounds. CRC Press, Boca Raton, USA.

National Occupational Health and Safety Commission (1994a) National Code of Practice for the Preparation of Material Safety Data Sheets [NOHSC:2011(1994)]. Australian Government Publishing Service, Canberra.

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National Occupational Health and Safety Commission (1995) Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment, [NOHSC:1003(1995)]. In: Exposure Standards for Atmospheric Contaminants in the Occupational Environment: Guidance Note and National Exposure Standards. Australian Government Publishing Service, Canberra.

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